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11. SUPPLEMENTARY NOTES

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13. ABSTRACT (Maximum 200 words)

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**ABSTRACT** 

The processing and the analysis of the computer sounding vertical ionograms for the station Roquetes, Spain was made from June to November of 1991 (approximately 4300 ionograms) for the evaluation of F spread echo and scattered conditions in F layer. The examples of the ionograms with spread and disturbed signals and first results of their analysis are given for 1991.

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ATTACHMENT 1 PAGE 1 OF 2

# CORRELATION AND GRADIENT CHARACTERISTICS OF IONOSPHERIC PARAMETERS IN EUROPE

by

E. Heyman
E. E. Tsedilina
O.V. Weitsman

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RAMOT BY TEL AVIV UNIVERSITY DEPARTMENT OF PHYSICAL ELECTRONICS, FACULTY OF ENGINEERING

CONTRACT NUMBER N68171-94-C-9119

3rd Interim Report

March 1994 - May 1994

The Research reported in this document has been made possible through the support and sponsorship of the U.S. Army. This report is intended only for the internal management use of the Contractor and U.S. Government.

## 1. STATEMENT OF WORK

For the period under review we continued the computer processing of the vertical ionograms from the station Roquetes, Spain, 1991. This work has been done, as the work in the 2nd Interim Report, for the reason of the evaluation of spread F echo or the scattering conditions in the upper ionosphere (F1, F2 layers). The method of indication of the spread of the echo or determination of disturbances in the signals of the F traces of first reflection was evaluated in the previous period of work. This method was used without changes for analysis of the traces on the ionograms. A short description of this method was done in the 2nd Interim Report N68171-94-C-9119. For the sake of reader convenience we give below the description of this method too.

The evaluated indexes and the letters in the tables (see table in Appendix) which describe the spread and disturbed F traces are the next ones. disturbed traces in F region with frequency spread are determined by the letters f, ff, fff (accordingly with numerical points 4, 5, 6) that describe strong, very strong and very, very strong disturbed traces with frequency spread of signals. Corresponding range spread of echo was determined by the letter r, and mixed type of spread - by both letters rf. The letters c, cc, ccc with points 1, 2, 3 are used for determining the traces with very small, small and close to strong types of spread. Approximately the letters c, f, ff and fff describe the traces with frequency brouding and the width of the echo in 0.5-0.8 MHz, 0.8-1.0 MHz, 1.0-1.5 MHz, 1.5-2 MHz. We use also evaluative letters such as B - for absorbtion, S - for noises, w - for week signal, A - for breaks in traces, E - for covering F traces by repeating reflections from E region (from E, E<sub>S</sub> layers), T - for technical reasons of violations. The dash means the absence of the ionogram or the trace at the ionogram, the absence of the dash or indexes c, f, r means the normal echo (See table in Appendix).

The results of processing approximately 8500 ionograms for one year of 1991 were obtained. Parts of these results were given in the 2nd Interim Report. The results of processing the second part of ionograms for 1991 and their analysis are given here in Tables 1-4 and Figures 1-4. Examples of ionograms with different indexes for F echoes and evaluating operative table for October 1991 are shown in Appendix.

Hour probability  $P_h$  of scattered F traces, equal to  $\Sigma_i$  / N, where  $\Sigma_i$  is the sum of hour points for considered month and time and N is the number of

ionograms with evaluated F traces, is given for 1991 in Table 1 and for summer and autumn of 1991 in Figure 1. According to definition of this probability usual state of F traces has probability close to 1. This is seen in Tab. 1 and Fig 1. It can be explained of the fact that very little amount of traces is observed without any disturbances. In this case they have no points and their probability  $P_h = 0$ . The most amounts of cases have indexes ccc or points 1. They are the cases with few disturbances. That why the main hour probability of traces with scattered signals  $P_h$  is close to 1 (see also table in Appendix). Notice here that analogies' data for winter and spring were given in 2d Interim Report.

Numbers  $N_s$  of F traces with strong spread for 1991 (indexes f, ff, fff, r, rf) are given in Table 2 for whole year and in Figure 2 for summer and autumn of 1991.

Mean month probability  $P_m$  of traces with scattered signals and sum number  $N_d = \sum N_s$  of strong disturbed traces (f, ff, rf, r) for every month of 1991 are given in Table 3 and shown in Figures 3 and 4.

There is hour probability for every month of 1991  $P_N = N_c / N$  of F spread, where  $N_c$  is the sum of all frequency and range spread cases with indexes c, f, ff, fff, fr, r for all indicated hours in every day of each month of 1991, for station Roquetes, in Tab. 4. Here N is the number of ionograms with reflected signals for all indicated hours during every month.

One can see from obtained data the diurnal, season and terminator effects in the appearance of strong F spread echoes and scattered F traces. Detailed analysis of this data will be given in Final Report.

### 2. PUBLICATIONS

1. H. Soicher, F. Gorman, E. E. Tsedilina and O. V. Weitsman, Comparison of the IRI-90 with measured ionospheric parameters at midlatitudes, Adv. Space Res., 16, No 1, (1)129-(1)132, 1995.

# 3. RESEARCH PROGRAMS

Next we are going to consider and perform the work:

1. To obtain the probability of appearance of sporadic  $E_S$  with  $f_0E_S > 3$  MHz for the station Roquetes, Spain, 1991.

- 2. To separate all cases with full absorbtion of the signals in ionograms for 1991 and give their morphological statistics for one year.
- 3. To perform some special analysis and give geophysical interpretation of the diurnal, seasonal and terminator dependencies of observed spread of F echo and scattered signals at midlatitudes.
  - 4. Estimation of correlation characteristics of the parameter  $f_0F2/f_0E$ .
- 5. A preparation of the results of the ionogram analysis for Final report and publications.

Table 1. Probability Ph of F traces with scattered signals; Roquetes .Spain, 1991.

Hour/Mon	Dec -Jan	February	March	April	May	June	July	August	September	October	November	Ь
0.1	1.31	1.39	1.33	1.68	1.40	2.25	2.57	2.30	1.74	1.82	1.33	1.74
02	1.25	1.30	1.07	1.60	1.50	2.75	2.61	2.67	1.63	1.83	1.75	1.81
03	1.50	1.65	1.17	1.70	1.60	2.75	2.55	2.33	1.81	1.77	1.88	1.88
04	1.20	1.43	1.68	1.60	1.70	2.75	2.65	2.38	1.85	1.75	2.12	1.92
05	1.90	1.23	1.67	1.90	2.10	2.24	2.71	2.48	2.32	1.72	1.80	2.01
90	1.50	1.14	1.66	2.10	2.70	2.41	3.13	2.74	3.10	2.28	2.00	2.25
07	1.75	1.64	1.07	2.05	2.40	2.16	3.10	2.97	3.30	2.80	2.29	2.32
80	1.50	1.77	1.30	1.60	1.50	1.84	2.24	2.36	2.63	2.81	2.04	1.96
60	2.35	1.61	1.17	1.30	1.40	1.26	1.94	2.07	2.47	1.90	1.93	1.76
10	1.90	1.29	1.17	1.13	1.20	1.00	1.53	1.61	1.83	1.55	1.66	1.44
11	1.30	1.12	1.10	0.94	1.10	1.16	1.92	1.64	1.71	1.74	1.83	1.41
12	1.48	1.28	0.87	0.94	1.20	1.33	1.50	1.63	1.78	1.59	1.79	1.46
13	1.52	1.20	0.83	1.17	0.70	06.0	1.48	1.59	1.7.1	1.65	1.64	1.31
14	1.50	1.24	0.85	1.16	0.80	1.05	1.16	1.63	1.83	1.71	1.79	1.34
15	1.86	1.16	0.97	1.28	06.0	0.75	1.48	1.65	1.89	1.97	98.1	1.43
16	2.11	1.28	1.00	1.10	0.80	1.31	1.64	1.75	2.00	2.03	1.68	1.52
17	1.35	1.04	1.07	1.80	1.30	1.61	2.15	2.10	2.07	1.97	1.81	1.66
18	0.84	09.0	1.04	1.95	1.80	1.76	2.38	2.18	2.03	1.96	1.64	1.65
61	1.01	1.32	0.75	1.40	1.60	1.86	2.25	1.86	2.03	1.96	1.25	1.57
20	1.02	1.12	0.73	1.25	1.30	1.26	1.92	1.85	1.86	1.93	1.77	1.46
21	1.81	0.83	1.07	1.20	1.07	1.80	2.11	2.11	1.67	1.84	1.12	1.51
22	1.45	1.12	1.00	1.10	1.20	1.86	2.43	2.38	1.83	1.81	1.61	1.62
23	1.25	0.83	06.0	1.25	1.50	2.24	2.31	2.41	1.57	1.93	1.76	1.63
24	1.38	0.67	1.13	1.26	1.70	1.97	2.46	2.31	1.54	1.87	1.48	1.62
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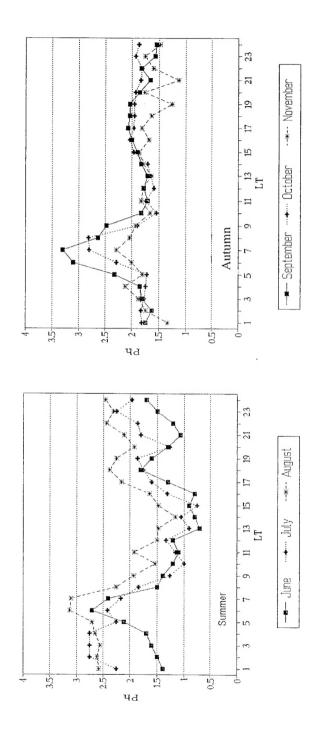
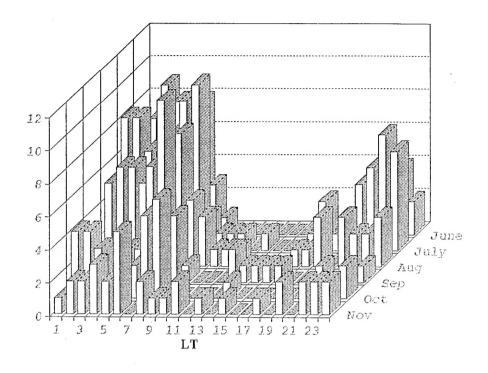


Fig.1. Variations of hour probability Ph., Roquetes, June - November, 1991.

Table 2. Number Ns of F traces with strong spread (f, ff, fff, fr, r); Roquetes, Spain, 1991.

	T																								
$\bowtie$		25	29	32	98	27	53	46	21	9	3	4	_	4	3	3		4	6	5	3	8	11	15	16
November		_	2	2	3	2	5		2	1	1	2		1		. 1			-1		2		2	2	2
October		4	4	3			2	5	9						_								2		2
March April May June July August September October November					2	2	L	11	4	1				2	1	_	1	1							1
August		5	9	9	5	4	7	8	4	3	_	_	1					1	1	3		3	2	2	3
July		×	8	9	9	7	6	10	2	_	_	_		-				_	3	_	_	4	5	7	9
June		S	7	6	~	3	×	3	_										_	-		-		4	2
May			_	3	4	4	5	9	2									_	2						
April		_	_	2	2		3	3							_	_			_						
March				_	2	2	3																		
Dec- February		_			2																				
	Jan				_	2	3	2	2	3	-										_	3	2	2	-
Hour/Mon		10	02	03	04	05	90	07	08	60	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24



 $\mathbf{Fig.2}$  . Number of F traces with strong spread ; Roquetes , Spaine , 1991 .

**Table 3.** Mean month probability Pm of F traces with scattered signals and full number Nd of strong disturbed traces (f, ff, ff, fr, r, r) for 1991; R-mean sunspot number.

						-					
Month	Dec-Jan	February	March	April	May	June	July	March April May June July August	September October November	October	November
Pm	1.50	1.21	1.08	1.44	1.44 1.40 1.75	1.75	2.18 2.13	2.13	2.01	1.93	1.74
PN	23	5	80	15	29	53	53 90 63	63	34	30	32
R	140.6	167.9	141.9	140.0	140.0 121.3 189.7 173.7 176.3	189.7	173.7		125.3	144.1	108.2

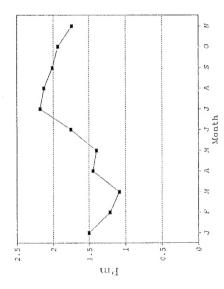


Fig. 3. Mean month probability of F traces with scattered signals; Roquetes; Spaine, 1991.

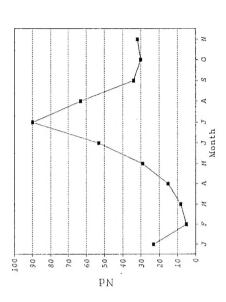
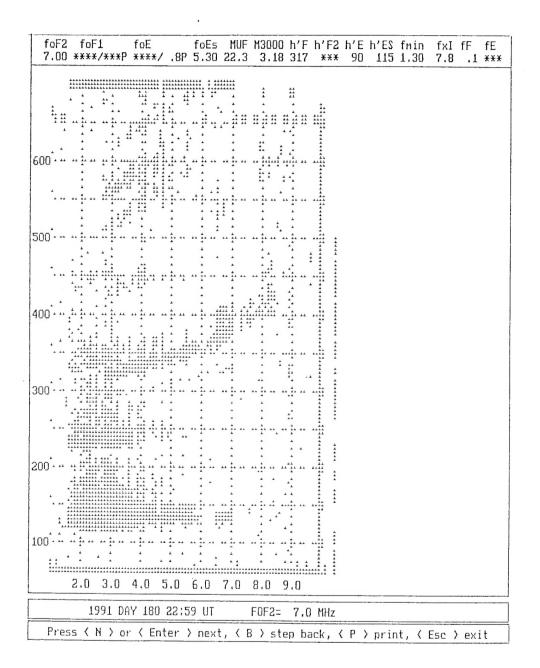


Fig. 4. Full number of full disturbed traces for 1991, Roquetes, Spain.

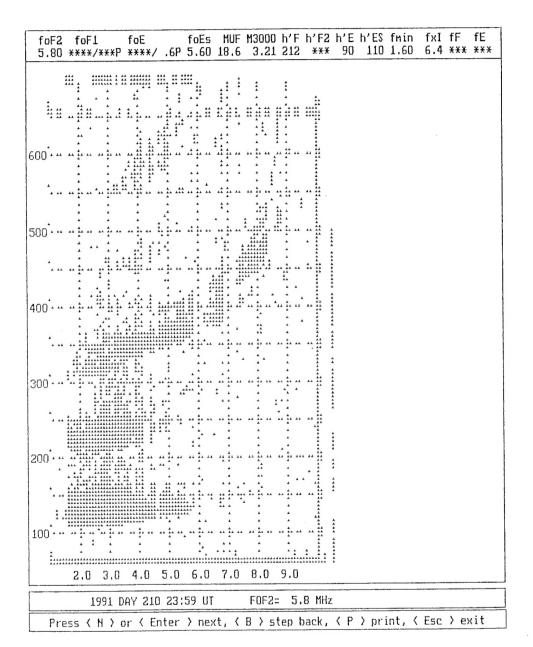
Table 4. Probability  $P_N = Nc/N$ , N - number of days, Nc - number of cases c, f, ff, fff, r; Roquetes, Spain, 1991.

0.130         0.067         0.110         0.130         0.460         0.430         0.400         0.190         0.210           0.130         0.033         0.220         0.140         0.540         0.570         0.074         0.207           0.130         0.033         0.220         0.140         0.540         0.570         0.190         0.207           0.170         0.065         0.110         0.170         0.500         0.340         0.190         0.200           0.045         0.130         0.220         0.200         0.340         0.300         0.250           0.045         0.130         0.220         0.200         0.340         0.300         0.240           0.045         0.130         0.220         0.500         0.410         0.380         0.340         0.320         0.200           0.045         0.130         0.220         0.410         0.380         0.360         0.320         0.410           0.045         0.035         0.410         0.380         0.260         0.300         0.410           0.045         0.035         0.170         0.170         0.170         0.170         0.170           0.040         0.055	Dec-	February	March	April	May	June	July	August	September	October	November
0.067         0.110         0.150         0.460         0.430         0.400         0.190         0.210           0.033         0.220         0.140         0.540         0.640         0.570         0.074         0.207           0.069         0.110         0.170         0.540         0.500         0.190         0.200           0.130         0.220         0.200         0.500         0.340         0.300         0.250           0.130         0.220         0.200         0.500         0.340         0.220         0.240           0.130         0.220         0.330         0.380         0.540         0.520         0.240           0.130         0.220         0.410         0.800         0.560         0.320         0.240           0.140         0.450         0.410         0.800         0.560         0.900         0.410           0.035         0.410         0.720         0.720         0.740         0.050         0.040         0.410           0         0.055         0.074         0.059         0.170         0.170         0.140         0.053           0         0.055         0.074         0.059         0.170         0.140         0											
0.035         0.220         0.140         0.540         0.640         0.570         0.074         0.207           0.069         0.110         0.170         0.540         0.480         0.500         0.190         0.200           0.210         0.220         0.200         0.500         0.340         0.300         0.250           0.130         0.220         0.500         0.500         0.340         0.320         0.240           0.130         0.220         0.530         0.580         0.540         0.520         0.240           0.140         0.440         0.550         0.410         0.560         0.320         0.240           0.035         0.140         0.550         0.410         0.560         0.410         0.530           0.037         0.170         0.170         0.190         0.470         0.630         0.630           0         0.055         0.074         0.059         0.120         0.170         0.170         0.074         0.058           0         0.055         0.074         0.059         0.170         0.170         0.074         0.058           0         0.055         0.080         0         0.170         0.140 <td></td> <td>0.130</td> <td>0.067</td> <td>0.110</td> <td>0.130</td> <td>0.460</td> <td>0.430</td> <td>0.400</td> <td>0.190</td> <td>0.210</td> <td>0.170</td>		0.130	0.067	0.110	0.130	0.460	0.430	0.400	0.190	0.210	0.170
0.170         0.069         0.110         0.170         0.540         0.480         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.500         0.520 <th< td=""><td></td><td>0.130</td><td>0.033</td><td>0.220</td><td>0.140</td><td>0.540</td><td>0.640</td><td>0.570</td><td>0.074</td><td>0.207</td><td>0.290</td></th<>		0.130	0.033	0.220	0.140	0.540	0.640	0.570	0.074	0.207	0.290
0.130         0.220         0.220         0.500         0.500         0.340         0.320         0.250         0.240         0.250         0.240         0.250         0.320         0.240         0.240         0.240         0.240         0.240         0.240         0.240         0.240         0.240         0.250         0.240 <th< td=""><td></td><td>0.170</td><td>0.069</td><td>0.110</td><td>0.170</td><td>0.540</td><td>0.480</td><td>0.500</td><td>0.190</td><td>0.200</td><td>0.290</td></th<>		0.170	0.069	0.110	0.170	0.540	0.480	0.500	0.190	0.200	0.290
0.045         0.130         0.220         0.380         0.540         0.520         0.320         0.380         0.540         0.520         0.320         0.540         0.520         0.360         0.560         0.320         0.540         0.560         0.560         0.500         0.410         0.410         0.520         0.410         0.800         0.600         0.900         0.630         0.410         0.630         0.410         0.630         0.410         0.630         0.640         0.650         0.630         0.640         0.650         0.650         0.630         0.650 <th< td=""><td>_</td><td>0.130</td><td>0.210</td><td>0.220</td><td>0.200</td><td>0.500</td><td>0.500</td><td>0.340</td><td>0.300</td><td>0.250</td><td>0.400</td></th<>	_	0.130	0.210	0.220	0.200	0.500	0.500	0.340	0.300	0.250	0.400
0.015         0.140         0.440         0.550         0.410         0.800         0.560         0.860         0.980         0.410         0.410         0.550         0.410         0.800         0.560         0.900         0.650 <th< td=""><td></td><td>0.045</td><td>0.130</td><td>0.220</td><td>0.330</td><td>0.380</td><td>0.540</td><td>0.520</td><td>0.320</td><td>0.240</td><td>0.280</td></th<>		0.045	0.130	0.220	0.330	0.380	0.540	0.520	0.320	0.240	0.280
0.045         0.036         0.450         0.045         0.045         0.045         0.045         0.045         0.040         0.050         0.040         0.050         0.050         0.040         0.050         0.040         0.050         0.040         0.050         0.071         0.070         0.050         0.070         0.050         0.071         0.070         0.050         0.050         0.071         0.070         0.050         0.050         0.071         0.071         0.070         0.050         0.050         0.071         0.071         0.053         0.050         0.071         0.071         0.053         0.068         0.071         0.074         0.068         0.071         0.074         0.068         0.071         0.074         0.068         0.074         0.075         0.070         0.074 <th< td=""><td></td><td>0.015</td><td>0.140</td><td>0.440</td><td>0.550</td><td>0.410</td><td>0.800</td><td>0.560</td><td>0.860</td><td>0.410</td><td>0.350</td></th<>		0.015	0.140	0.440	0.550	0.410	0.800	0.560	0.860	0.410	0.350
0.180         0.037         0.170         0.130         0.240         0.320         0.670         0.650           0.043         0.043         0.097         0.053         0.210         0.190         0.470         0.200           0.083         0         0.063         0.074         0.059         0.120         0.071         0.170         0.070         0.034           0.042         0         0.059         0.080         0         0.170         0.170         0.074         0.068           0.040         0         0.059         0.080         0         0.170         0.170         0.074         0.068           0.040         0         0.055         0         0         0.170         0.170         0.140         0.068           0.040         0         0.055         0         0         0.170         0.140         0.049         0.049         0.040 <t< td=""><td></td><td>0.045</td><td>0.036</td><td>0.520</td><td>0.430</td><td>0.320</td><td>0.760</td><td>0.660</td><td>0.900.</td><td>0.630</td><td>0.320</td></t<>		0.045	0.036	0.520	0.430	0.320	0.760	0.660	0.900.	0.630	0.320
0.043         0         0.055         0.097         0.053         0.210         0.190         0.470         0.200           0.083         0         0.063         0.074         0.059         0.120         0.071         0.170         0.071         0.034           0.042         0         0.059         0         0         0.170         0.170         0.071         0.068           0.040         0         0.059         0.080         0         0.110         0.074         0.058           0.040         0         0.055         0         0         0.170         0.140         0         0.068           0.040         0         0.0110         0.056         0.053         0.040         0.140         0         0.068           0.040         0         0.055         0.034         0         0.160         0.049         0.140         0.049         0         0.068           0.080         0         0.050         0.070         0.115         0.116         0.071         0.049         0.049         0.071         0.049           0.080         0         0.050         0.010         0.010         0.050         0.010         0.024         0.039		0.180	0.037	0.170	0.170	0.320	0.240	0.320	0.670	0.650	0.390
0.083         0         0.063         0.0744         0.059         0.120         0.071         0.170         0.071         0.068           0.042         0         0.059         0         0         0.170         0.120         0.071         0.068           0.040         0         0.059         0.080         0         0.170         0.110         0.074         0           0.040         0         0.055         0         0         0.170         0.140         0         0.068           0.040         0         0.110         0.035         0.034         0         0.140         0.140         0         0.068           0.040         0         0.055         0.034         0         0.160         0.071         0         0.160         0.074         0         0.065         0	0	0.043	0	0.055	0.097	0.053	0.210	0.190	0.470	0.200	0.074
0.042         0         0.059         0         0         0.170         0.120         0.071         0.068           0.040         0         0.059         0.080         0         0.110         0.074         0           0.040         0         0.055         0         0         0.110         0.074         0         0.140         0           0.040         0         0.0110         0.036         0.053         0.040         0.140         0.140         0           0.040         0         0.055         0.034         0         0.160         0.045         0.040         0         0.068         0         0.071         0.049         0         0.058           0.080         0         0         0.050         0.070         0.115         0.140         0.036         0.074         0.049         0         0.052         0.016         0.036         0.074         0.036         0.074         0.049         0.049         0.049         0.049         0.049         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044         0.044	0	0.083	0	0.063	0.074	0.059	0.120	0.071	0.170	0.034	0.103
0.040         0         0.059         0.080         0         0.170         0.110         0.074         0           0.040         0         0.055         0         0         0.190         0.069         0.140         0           0.040         0         0.0110         0.036         0.053         0.040         0.140         0         0.068           0.040         0         0.055         0.034         0         0.160         0.071         0.105         0.079         0.070         0.071         0.065         0.071         0.079         0.071         0.071         0.071         0.071         0.071         0.071         0.071         0.072         0.071         0.072         0.071         0.072         0.072         0.074 <td>0</td> <td>0.042</td> <td>0</td> <td>0.059</td> <td>0</td> <td>0</td> <td>0.170</td> <td>0.120</td> <td>0.071</td> <td>0.068</td> <td>0.103</td>	0	0.042	0	0.059	0	0	0.170	0.120	0.071	0.068	0.103
0         0.055         0         0         0.190         0.069         0.140         0.068           0         0.110         0.036         0.053         0.040         0.170         0.140         0.068           0         0.055         0.034         0         0.160         0.065         0.071         0.097           0         0.050         0.070         0.115         0.110         0.017         0.035           0         0.200         0.035         0.106         0.350         0.140         0.069         0.074           0         0.050         0.170         0.240         0.040         0.067         0.170           0         0.050         0.101         0.276         0.320         0.067         0.170           0         0.050         0.071         0.037         0.320         0.034         0.240           0         0         0.050         0.071         0.037         0.320         0.260         0.034           0         0         0         0.037         0.130         0.420         0.210         0.190           0         0         0         0.040         0.140         0.440         0.010	0.050	0.040	0	0.059	0.080	0	0.170	0.110	0.074	0	0.071
0.040         0         0.110         0.036         0.053         0.040         0.110         0.068           0.040         0         0.055         0.034         0         0.160         0.065         0.071         0.097           0         0         0         0.055         0.070         0.115         0.116         0.071         0.097           0         0         0         0.050         0.070         0.115         0.110         0.071         0.093           0         0         0         0.050         0.075         0.106         0.130         0.036         0.074           0         0         0         0.050         0.170         0.240         0.140         0.069         0.074           0         0         0         0.050         0.101         0.276         0.320         0.067         0.034         0.170           0         0         0         0.050         0.071         0.037         0.380         0.260         0.0190           0         0         0         0         0.034         0.170         0.430         0.420         0.210         0.170           0         0         0         0	0	0.040	0	0.055	0	0.	0.190	0.069	0.140	0	0.071
0.040         0         0.055         0.034         0         0.160         0.065         0.071         0.097         0.097           0         0         0         0.050         0.070         0.115         0.110         0.107         0.107         0.032           0         0.080         0         0.035         0.106         0.350         0.130         0.036         0.074           0         0         0.050         0.170         0.240         0.450         0.140         0.065         0.074           0         0         0.050         0.101         0.276         0.320         0.067         0.074         0.070           0         0         0.050         0.071         0.037         0.320         0.077         0.034         0.190           0         0         0         0.037         0.130         0.380         0.260         0.0190           0         0         0         0.034         0.170         0.420         0.210         0.260           0         0         0.067         0.050         0.140         0.440         0.071         0.170           0         0         0.067         0.050         0.140	0	0.040	0	0.110	0.036	0.053	0.040	0.170	0.140	0.068	0.035
0         0         0.050         0.070         0.115         0.110         0.071         0.107         0.032           0.080         0         0.200         0.035         0.106         0.350         0.130         0.036         0           0.040         0         0.300         0.170         0.240         0.450         0.140         0.069         0           0         0         0.050         0.101         0.276         0.320         0.067         0.074         0           0         0         0.050         0.071         0.037         0.320         0.077         0.034         0.190           0         0         0         0.037         0.130         0.260         0.033         0.190           0         0         0         0.037         0.130         0.420         0.210         0.260           0         0         0         0.034         0.170         0.430         0.420         0.210         0.260           0         0.067         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0         0.067         0.260         0.310         0.370	0	0.040	0	0.055	0.034	0	0.160	0.065	0.071	0.097	0.071
0.080         0         0.200         0.035         0.106         0.350         0.130         0.036         0.074         0           0.040         0         0.300         0.170         0.240         0.450         0.140         0.069         0.074           0         0         0.050         0.101         0.276         0.320         0.067         0.170           0         0         0.050         0.071         0.037         0.320         0.077         0.034         0.170           0         0         0         0.037         0.130         0.380         0.260         0.190           0         0         0         0.037         0.130         0.420         0.210         0.260           0         0         0         0.034         0.170         0.430         0.440         0.010         0.260           0         0         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0         0.067         0.050         0.260         0.310         0.480         0.180         0.270	0	0	0	0.050	0.070	0.115	0.110	0.071	0.107	0.032	0
0.040         0         0.300         0.170         0.240         0.450         0.140         0.069         0.074           0         0         0.050         0.101         0.276         0.320         0.036         0.0170           0         0         0.050         0.071         0.037         0.320         0.077         0.034         0.240           0         0         0         0.071         0.037         0.130         0.360         0.034         0.190           0.080         0         0         0.037         0.170         0.430         0.210         0.260           0         0.067         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0.067         0.050         0.260         0.310         0.480         0.180         0.270	0	0.080	0	0.200	0.035	0.106	0.350	0.130	0.036	0	0.038
0         0         0.050         0.101         0.276         0.320         0.036         0.067         0.170           0         0         0.050         0.071         0.037         0.320         0.077         0.034         0.240           0         0         0         0.037         0.130         0.380         0.260         0.033         0.190           0         0         0         0         0.034         0.170         0.430         0.260         0.033         0.190           0         0         0         0         0.034         0.170         0.430         0.420         0.210         0.260           0         0         0         0.140         0.410         0.380         0.440         0.071         0.170           0         0         0.067         0.050         0.260         0.310         0.360         0.480         0.180         0.170	0	0.040	0	0.300	0.170	0.240	0.450	0.140	690.0	0.074	0.080
0         0         0.050         0.071         0.037         0.320         0.077         0.034         0.240           0         0         0         0.037         0.130         0.380         0.260         0.033         0.190           0         0.080         0         0         0.034         0.170         0.430         0.420         0.210         0.190           0         0.067         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0.067         0.050         0.260         0.310         0.360         0.480         0.180         0.270	0	0	0	0.050	0.101	0.276	0.320	0.036	0.067	0.170	0.100
0         0         0         0.037         0.130         0.280         0.260         0.033         0.190           0.080         0         0         0.034         0.170         0.430         0.420         0.210         0.260           0         0.067         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0.067         0.050         0.260         0.310         0.360         0.480         0.180         0.270	0	0	0	0.050	0.071	0.037	0.320	0.077	0.034	0.240	0.190
0.080         0         0.034         0.170         0.430         0.420         0.210         0.260           0         0.067         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0.067         0.050         0.260         0.310         0.360         0.480         0.180         0.270		0	0	0	0.037	0.130	0.380	0.260	0.033	0.190	0.160
0         0.067         0.050         0.140         0.410         0.380         0.440         0.071         0.170           0         0.067         0.050         0.260         0.310         0.360         0.480         0.180         0.270	0	0.080	0	0	0.034	0.170	0.430	0.420	0.210	0.260	0.190
0 0.067 0.050 0.260 0.310 0.360 0.480 0.180 0.270	0	0	0.067	0.050	0.140	0.410	0.380	0.440	0.071	0.170	0.200
	_	0	0.067	0.050	0.260	0.310	0.360	0.480	0.180	0.270	0.160

# APPENDIX



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29 July 1991, index fff

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	27	1	-		- ا	0	-	177	- 40	1	6.14		-	C. P.		1	2000	4 3	1	4 CACA	-	1	800	1		6.29			12 STA	9	-			7.00	. \	N PLY WITH	7	200 L	F CrSA	7 6 4	1	と近り		7	3.26		- 26	1 30	3 1.87	1 + 1
	2 2.3	-20	,	3	7	15	1	777	MTINA		0	- (	1	_	7		700 /	,	127	Fry Cr	-	77	シューヤン	-	2000	16 A Cr	1		5CM 11 CC	Lecel Co			CCC NJ	9	7	100000	-		835 -BF			田子 子子	A SE	11.125	1 7 136	T	516	31	7 184 1.5	ું ર
-i	21 2	10 1 1 V V	2	ا	100 6	000	1	Co An. C	000	10	7	);	1	5 5 6		100	1000	-5	<u> </u>	00		7-4-6-	6 6 111 1		7 255	60.4	-	-6-47	Cern	EVE	CCCA		CC. C. C. L. L. C	2	1 700	47.4	-	22	& CLYR	20.00	רנעכ	5	_		5 + 150	1	+	37	1:54	-7-
	20	S. CAA		1 2 1	1. CC A	V (8		B CC 11B	17 19	1	9 00.93	-0	1	B 1015B	1	7	LA POLAL	, ,	70000	A CC A	17	マシ	_		4 561	81 1/ A				Su 50 AE	18 CC 1.		a cara.	AT. C.A.	R cAMB		_	7	Pro R FB		77 77	7777	زر	40 000	7+1:8 7 +128		1	51	561 1.193	
	61 81	Splay KNO		-4-3-077	CA 60 K	4 40 41.4.4	777-1777	61A 60 AB	1 10, 10,0	1000	COACOL		7777	8217 KV2			CON. 6 16	60	100 mil	C. N.A. 16	1	54. 50A.	ce 4 1 cd A	1	CUA 5012	= 12/2 Col 81	-		Cd211 - 18	COM13 - 54	100 51700		CG18. 40	4097 4001	C. WK	1	'n	7	100	200		1510- EC	00 00	Q	1416 74		53 57	6) ()	1.96 7	
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1 27 6 6.6	9 10	11/2/11	2		EC 131 CA	,	-1-0-0-	12 0 12	-4	2	2		75/27	1000	-	1	111			7 00 17	1		20 0		547 25	Cre Cunst		C C 15 CC6 AL	E 427B	CHAB CHAR	80 10 V CO A	7/17	77	80000		-	1777 17	-187 c.t.	000			CLTWG -BE		1	12000	18	12	\$ C	532	
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